AMENDMENTS TO THE SPECIFICATION:

Please amend the specification as follows.

Paragraph 58:

In accordance with an alternate embodiment of the present invention the light source unit illustrated in FIG. 1 may omit the spinning filter wheel assembly 15,16,19,58. In this embodiment, an alternate detector unit is provided as illustrated in FIG. 5. Incoming light 36 transmitted from the source unit of FIG. 1 and reflected by the reflection unit of FIG. 2 passes through window 35 that has similar characteristics to window of source unit illustrated in FIG. 1, and is reflected by a reflector 38, which directs the light beam 40 onto beam splitter/combiner[s] 44[,45] which direct portion[s] 46[,47] of the light to the spectrometers 43[,42]. A portion 49 of light beam 40 passes through beam splitter/combiner 44 to beam splitter/combiner 45 where a portion 47 of the light is reflected onto spectrometer 42. The rest of the light 61 is focused on spinning reflector 62. Reflector 62 is a single faceted flat mirror with a reflective surface that is optimized for the infrared light wavelengths of interest, such as an enhanced gold reflective surface or other suitable reflective surface. Alternatively, a multifaceted spinning mirror may be used, however the geometry of the rest of the layout would have to be modified from what is illustrated in FIG. 5. The spinning reflector 62 splays the light in sequence around a stationary array of filters 52,53,54 and gas cells 70 by directing the beam 64 into the side of monolithic ellipsoidal mirror 80 which reflects the light 66 into the array, consistent with the splaying of the light. After passing through each stationary band pass filter 52,53,54 and gas cell 70, the light beam 72 is redirected to and focused on a single infrared detector 50 by a reflector 74 such as a

spherical mirror. The reflective surfaces of reflectors 80 and 74 are optimized for the wavelengths of interest in the same way as the surface of spinning reflector 62. The single infrared detector sees a sequence of pulses of light 76 that are essentially the same as those illustrated as FIG. 3 item 48. Each filter 52,53,54 of this array substantially limits the passage of light to a predetermined spectral wavelength or range of wavelengths. Some filter center wave specifications are listed in Table 1. Each gas cell 70 of this array substantially limits the passage of light of a particular spectral pattern of wavelengths absorbed by the known concentration of the gas of interest that the cell 70 contains.

A1 end

Paragraph 60:

It is instructive to refer to the illustration of FIG. 8 to further the understanding on why an ellipsoidal mirror (FIG. 5 item 80) is chosen to distribute light. An ellipsoidal mirror 200 has two focal points or foci 206,208. Such mirrors have the property that all light rays 202 diverging from a small spot <u>of a source 204</u> near one focal point 206 are reflected in such a way that those rays 210 are again focused into a small spot near the other focal point 208 of the mirror 200. Given the unique layout of the alternative embodiment of FIG. 5, and commensurate need for a dual foci reflective device for light distribution through a full 360° of rotation of the spinning reflector (FIG. 5 item 62), an ellipsoidal mirror is the best choice for this alternative embodiment.

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Paragraph 83:

In another embodiment, illustrated by FIG. 14, the light sources 10,12, beam splitter/combiners 140,160, infrared detector 50, and spectrometer 43 are positioned so that

A3

ultraviolet light beam 212 from source 12 is traveling along essentially the same optical path, but in the opposite direction from infrared light beam 14 from source 10. In this example, ultraviolet beam 212 is reflected off of beam splitter/combiner 140 to reflector 130, where it is reflected in optical path 132,134. Conversely, infrared beam 14 passes through beam splitter/combiner 160 to reflector 136 where it is reflected in optical path 214,216, which is essentially the same optical path as optical path 132,134, but in the opposite direction. This innovation is referred to herein as "opposed sources". An embodiment using opposed sources may eliminate the need for additional expensive, light attenuating components. For instance, if ultraviolet light 212 is directed towards, instead of away from, the infrared detector 50, the signal from the infrared detector 50 can degrade. If light 212 from an ultraviolet source 12 is traveling in the opposite direction from the light 14 emanating from the infrared source 10, the ultraviolet light 212 is naturally kept away from the infrared detector 50 without the use of additional wavelength dependent filters or beam splitter/combiners. Light sources 12,10 and detectors 43, 50 need to be matched with optical components of corresponding F-numbers for efficient light transmission. An embodiment using opposed sources, and first and second reflectors 130,136 of significantly different F-number, allows the sources or detectors requiring a higher F-number to be matched with the reflector with the higher F-number, and the sources and detectors requiring a lower F-number to be matched with the reflector with the lower F-number. This eliminates the need for additional optical components for F-number matching. Finally, opposed sources may significantly simplify component layout and reduction of thermal and electrical interference among components.

Paragraph 84:

FIG. 13 shows one possible arrangement of three sources 120, 144 and 146. In one preferred configuration, the source 120 is an infrared source, the source 144 is a visible light source, and source 146 is an ultraviolet light source. In this example, ultraviolet light 152 reflects off splitter/combiner 142 but does not pass through any splitter/combiners. The infrared light 122 passes through [two] splitter/combiner[s] 140 and follows optical path 150 to splitter/combiner 142. Visible light 148 reflects off splitter/combiner 140 and follows optical path 150 to splitter/combiner 142. However, the arrangement of these sources may be interchanged in any combination, and one or more source types may be omitted entirely.